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Rehabilitation Protocols for Total Hip Replacement Patients: A Comparison of Research and Practicing Physical Therapists

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Rehabilitation Protocols for Total Hip Replacement Patients: A Comparison of Research and Practicing Physical Therapists

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By
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ABSTRACT

Keeping procedures and recovery techniques current with new research is expected of the health professions. The main purpose of this study will be to compare the difference of opinion and implementation of recovery techniques, specifically full body weight bearing exercises, between physical therapists and current research in regards to a total hip replacement. By using a questionnaire created from the Eulenburg study (2015), Physical Therapists will record their own personal answers and opinions for the postop hip replacement recovery period. Information that will be gathered from this research will be beneficial for future practices to easily see if practicing Physical Therapists are actually keeping their methods current or if they are staying stagnant.

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INTRODUCTION

When any cause arises for a patient to need therapy in order to recover, be it due to surgery or an unavoidable injury, the patient is putting their trust in those caring for them. The patient trusts that the caregivers are doing all they can to ensure the optimal recovery for their patient by following a set of standard procedures. Those procedures are not just plucked out of the air as an arbitrary guide but rather it is based off of research, testing and demonstrating the optimal steps for recovery as well as when to implement each one.

Rehabilitation protocols will differ greatly depending on where the therapy is needed to take place on the body. One of the main focuses of recovery techniques when it comes to lower body rehabilitation is when the implementation of full body weight bearing exercises are used for the patient. Full body weight bearing exercises are a type of exercise in which the patient is not supported by any object such as a crutch, cane, walker, railings, etc. Some can be used in order to regain balance or act as safety measures but these objects do not support any of the patient's body weight for any extended period of time.

This study will focus on looking at current research and what it says about recovery protocols for patients who have undergone total hip replacement (THR), specifically looking at the timing of implementation for these procedures. The information will then be compared against what practicing physical therapists feel are the optimal recovery techniques and when they should be put into place for the patient.

Cvetanovich et. al. (2017) found in his study that “there is considerable variability in postoperative physical therapy protocols.” After his survey, his results showed that there were a number of distinct protocols due to different variables in the recovery process such as “including postoperative restrictions, rehabilitation activities, and time points for activities.” He found that “the duration of weight-bearing restriction was [a] median 3 weeks” and that this mean was due in part to the 111 participants in the survey. Lastly Cvetanovich et. al. found that “there was substantial variation in the rehabilitation activities and time points for initiating activities” (2017). These findings are important to demonstrate the varying opinions in regards to the recovery process of a THR and to possibly demonstrate a future need to optimize and standardize the recovery procedures while taking into account certain variable such as age and reason for replacement.

In another article, Eulenburg provides a survey where “participants were asked to suggest the optimal time for starting full weight bearing and resistance training after cemented and uncemented hip replacement” (2015). This study differs from Cvetonovich’s study in the fact that Eulenburg looks not only at the different opinions on the timing of weight bearing and resistance training but she also looks at the difference between cemented and uncememted hip replacements. This distinction between cemented and uncemented hip replacements is important because a cemented replacement uses a fast drying bone cement to adhere to the bone whereas uncemented replacements allow the bone to grow to the replacement. Eulenburg found that “Participants agreed that the course and the quality of surgery as well as the constitution of the patients individually have a major impact on the postoperative rehabilitation treatment” (2015). Even with this distinction between quality of surgery and the constitution of the patient, the consensus

for when to implement weight bearing exercises ranged from 0-5 days all the way to 7-8 weeks for cemented and 0-5 days to over 8 weeks for uncemented before the exercises began.

The observations and findings in both of these studies is important to note because they both show that there is quite a lot of variability pertaining to the timing of implementation of full body weight bearing exercises after a total hip replacement surgery. Eulenburg's study mentions a key point that the quality of the surgery as well as the patients's own physical constitution could be affecting a physical therapists decision on when to start weight bearing exercises. Another key factor could also be the age of the patient which could impact the constitution of the patient as well. The results of this study will be beneficial to see if practicing physical therapist opinions on when to start weight bearing exercises are aligned with what the current research is stating is the optimal time. This study will also assist in seeing if the recovery procedures need to be reviewed in order to create a more standardized set of procedures.

METHODOLOGY

Using a questionnaire is one of the most reliable methods of gathering data that can be compared to other data points. As such this study utilized a survey that was created by Eulenburg (2015) and adapted to better suit the specific needs and audience that this study was focusing on. The goal of the survey is to quantify the answers that a number of physical therapists gave when asked about a variety of questions related to the recovery of patients after receiving a total hip replacement. As a student who aspires to one day be a physical therapist, I found interest in learning about how practicing therapists' opinions differ on the timing of implementation of rehabilitation techniques.

Instrument

The instrument that was utilized in this study to create and distribute the survey was the application known as Qualtrics which was made available through the Georgia Southern student website. The survey which was supplied from Eulenburg's study was recreated in the application Qualtrics using Likert scales, multiple choice questions, and options to write in answers that were not provided in the choices.

Participants

In order to be included in this study the participants were required to be licensed physical therapists. Out of the numerous clinics and individuals contacted total of twenty-four licensed physical therapists responded and answered the survey that was sent to them via email. Additionally there were three responses that were sent from Athletic Trainers however because they were not licensed physical therapists, their responses and data were removed from the results. There was no stipulation in place that stated that the participant must have had a specified number of years of experience or any other such requirement other than being a licensed individual in their respective states.

Distribution

Once the replication of the survey was completed, it was then necessary to distribute it which was done using email as the primary communication method. Local physical therapy clinics were contacted initially via email, some through personal connections and others through researching different clinics, before then branching out and looking at clinics in surrounding areas. The recipients of the emails were asked to then forward the survey to any other physical therapists that they knew of that would

potentially be willing to answer the survey thus creating a snowball effect which would assist in gathering participants.

Data

Once the participant had finished answering the survey, their responses were then recorded and sent back to the application Qualtrics. From here the system is able to separate out the various answers from different participants as well as do a number of other analyzing functions such as graphs, charts, and statistics all without having to transfer the data to a separate system.

DATA ANALYSIS

By utilizing the application Qualtrics, the data that was gathered using the surveys distributed to the participants of this study can be looked at in a number of ways however all of them are quantitative in nature. The main purpose for this study was to look at the current research that has been conducted on the timing of implementation of full body weight bearing exercises in patients who have undergone a total hip replacement surgery and compare this to what practicing physical therapists say is the proper time frame. Each individual's responses from the survey can be looked at separately or group together with the other participant's answers. Qualtrics provides the tools to look and see the average answer for the timing of implementation as well as the range that the answers spanned. Also available through Qualtrics is the ability to look at what variables the participants felt would have the highest influence on the postoperative rehabilitation of the patients. This application allows the data to be displayed using graphs and even percentages in order to better visualize the different answers that the participants gave. Lastly the data on current research was gathered by using the online library resource known as Galileo

provided through the Georgia Southern University student website. The data found in the current research was then compared to the results found in this study.

RESULTS

The participants of the survey were asked a total of 14 questions and the first question was asking which profession the participant worked in. This was because the questionnaire was originally designed to be sent to a variety of other health professions such as surgeons, orthopedic physicians, rehabilitation physicians, exercises therapists, physical therapists, and other such professions. However only the data collected off of physical therapists was utilized in this study. From here the second question of the survey provided a set of data that showed the range of years of experience between participants. This range was from as low as not even a full year (0) all the way to 37 years of professional experience.

Facility

Question 3 of the survey asked the patients about which type of facility they worked in and gave them the options between outpatient rehabilitation clinics, acute inpatient hospital, inpatient rehabilitation clinics, physical therapy practice, or other. The other two choices that were added by participants where outpatient sports clinic and hospital based outpatient clinics. There was a total of 33 responses to this question however only 24 participants. This error could have been caused by subjects sharing the survey to others who answered a few questions and then never finished the rest of the survey to completion. This information about which setting each individual worked in is shown in Figure one.

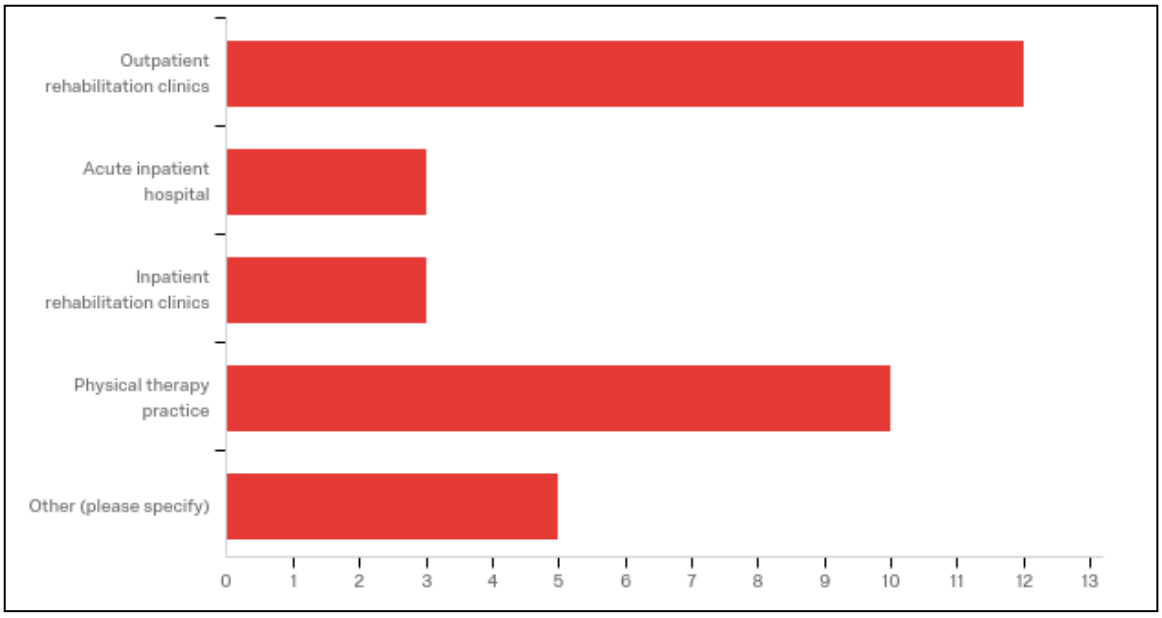

Figure1. Visualization of varying types of facilities that participants worked at when completing the survey

Average Number of Patients

The fourth question in the survey dealt with asking the subject for an estimate about how many patients they saw monthly who had undergone a total hip replacement surgery. This range of patients was found to be from as few as 1 patient a month all the way up to 15 patients a month. Averaging the answers that had been provided by the participants, it was found that the average number of patients a physical therapist would see in a month was around 5 total hip replacement patients.

Influences to postoperative recovery treatment

The fifth question in the survey asked the participants to rank how impactful different variables would affect the postoperative recovery treatments. Participants were able to use a Likert scale from 1 being unimportant to 5 being very important. Also at the end of this question participants were able to list their own variables that they felt would also impact the postoperative recovery treatment. The data gathered from this question

can be seen in Table 1 which demonstrates the minimum and maximum rank listed for that variable as well as the mean answer, and standard deviation.

#	STATSTABLEWIDGET.FIELD_NAME	Minimum	Maximum	Mean	Std Deviation
1	Type of prosthesis (cemented/uncemented)	1.00	5.00	3.44	1.17
2	Primary or secondary hip replacement	1.00	5.00	3.58	0.93
3	Quality of surgery	3.00	5.00	4.37	0.67
4	Course of surgery	1.00	5.00	4.04	0.92
5	Constitution of the patient	2.00	5.00	4.37	0.78
6	Further possible factors (please name)	1.00	5.00	4.38	1.08
7	Further possible factors (please name)	1.00	5.00	3.90	1.22
8	Further possible factors (please name)	1.00	5.00	3.75	1.64
9	Further possible factors (please name)	1.00	5.00	4.00	1.73

Table 1. Data gather for question 5 Likert scale of influences to postoperative rehabilitation treatment

Participants of this survey gave a number of other potential factors that they felt would also impact treatment and they were things such as; age, weight, previous hip pathology/surgery, activity level, surgical approach: anterior vs. posterior approach, support system, and the background of the rehabilitation team. Out of all these additional factors, some of the most commonly listed ones were age, weight, approach of surgery, and past pathology/surgery history. The highest ranking variables that were listed in the survey were found to be both the quality of the surgery as well as the constitution of the

patient. Both variables were found to be very important to the influence of the postoperative rehabilitation treatment.

Timing of Full Weight Bearing- Cemented

Question 6 of the survey asked the participants to choose from the listed options for when they believed the optimal time to introduce full weight bearing exercises was, specifically pertaining to patients with cemented prosthesis. By far the highest option that was chosen by participants was the 0-5 day option and the lowest option chosen was the more than 8 weeks choice. There two options that were not chosen by any participant and these were the 5-6 weeks and the 7-8 weeks options. This information is displayed in Figure 2.

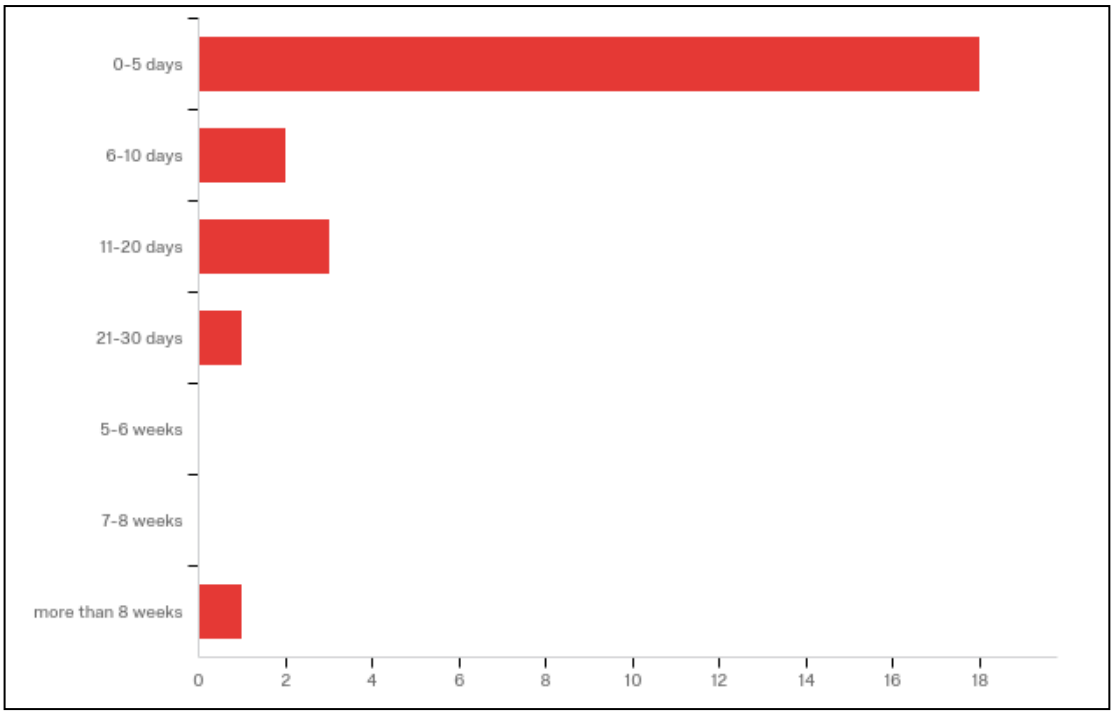

Figure 2. Graph demonstrating the number of participants who chose each time frame option for timing of implementation of full weight bearing exercises in patients with cemented prosthetics

Timing of Full Weight Bearing- Uncemented

In question 7 the participants were asked the same question that was asked in the previous one with the exception that now the prosthesis is uncemented instead of cemented. The majority of the participants in the survey felt that full weight bearing exercises should begin in the 5-6 week period after the surgery in order to ensure optimal recovery without complications. The option that was chosen the least was the 7-8 week option and no participant chose the option of waiting more than 8 weeks before starting full weight bearing exercises. The information gathered for this question can be seen displayed in Figure 3.

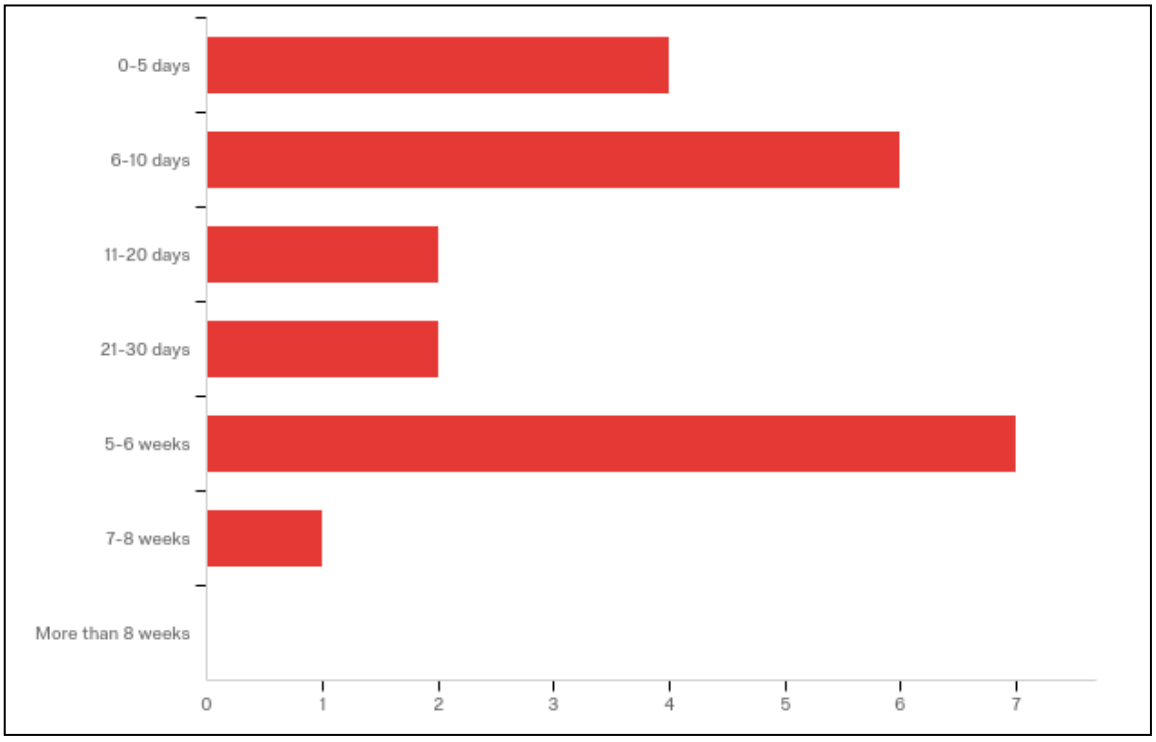

Figure 3. Graph demonstrating the number of participants who chose each time frame option for timing of implementation of full weight bearing exercises in patients with uncemented prosthetics

Timing of Resistance Training- Cemented

The next question that the participants were asked pertained to when they thought it was best to begin resistance training for patients who had undergone their surgery and received cemented prosthesis. The most common choice that was picked by the participants in the survey was found to be the 1-7 days postoperative whereas the option chosen the least was found to be 6-7 weeks postoperative. The information gathered on the participants opinions on the timing of resistance training postoperative for patients with cemented prosthesis can be seen in Figure 4.

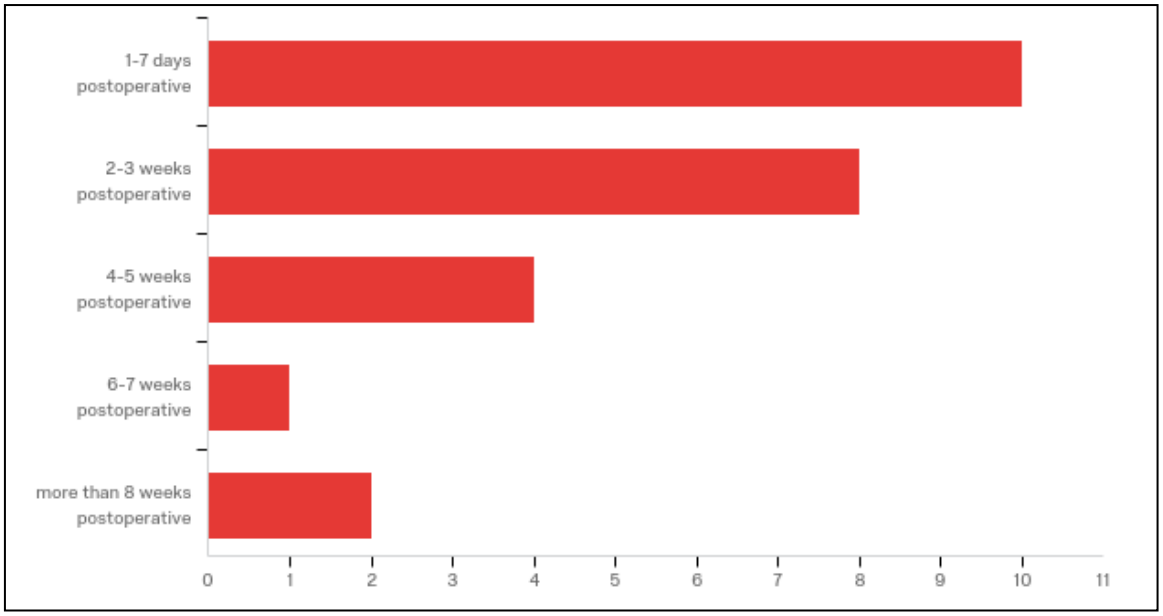

Figure 4. Graph demonstrating the number of participants who chose each time frame option for timing of implementation of resistance training in patients with cemented prosthetics

Timing of Resistance Training- Uncemented

Question 9 asked the when the physical therapist felt it would be most beneficial to being resistance training in patients who had undergone their hip replacement surgery and received uncemented prosthetics. The option that was chosen more often than the others was found to be the 2-3 weeks postoperative option. Only one of the participants in

the survey felt that the optimal time to begin resistance training was after more than 8 weeks postoperative. The information on the physical therapists choices for this question can be seen in Figure 5.

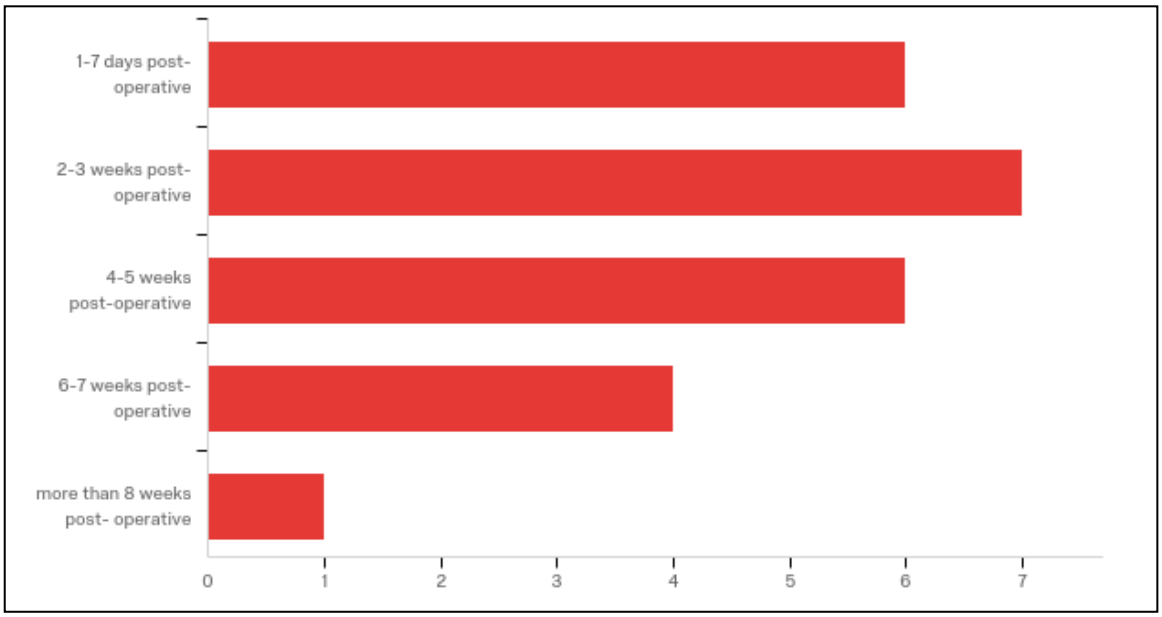

Figure 5. Graph demonstrating the number of participants who chose each time frame option for timing of implementation of resistance training in patients with uncemented prosthetics

Key Exercises

The tenth question in the survey listed a total of 12 different exercises that are commonly used in different rehabilitation facilities and asked the participants to rank them using a Likert scale with 1 being highest priority and 5 being of lowest priority. Of the 12 listed exercises that participants had to rank in the survey, the one that was giving the highest priority among them all was continuous passive motion according to the mean which was found to be 2.35. Whereas the exercise listed with the least priority was found to be gait training at 3.57 according to the mean. This information is show in Table 2.

#	STATSTABLEWIDGET.FIELD_NAME	Minimum	Maximum	Mean	Std Deviation
1	Gym exercises	1.00	5.00	3.46	1.58
2	Continuous passive motion	1.00	5.00	2.35	1.62
3	Neuromuscular / sensorimotor training	1.00	5.00	3.35	1.34
4	Stretching	1.00	5.00	3.21	1.22
5	Water exercises	1.00	5.00	2.37	1.56
6	Gait training	1.00	5.00	3.57	1.64
7	Stair climbing	1.00	5.00	3.17	1.37
8	Ergometer cycling	1.00	5.00	3.13	1.08
9	Walking exercises	1.00	5.00	3.39	1.63
10	Manual therapy	1.00	5.00	3.26	1.15
11	Individual physiotherapy	1.00	5.00	3.71	1.61
12	Group exercises	1.00	5.00	2.38	1.59

Table 2. Data found by using a Likert Scale (1 high priority – 5 low priority) on which exercises in a rehabilitation facility is given the most priority

Objectives for Rehabilitation

Question 11 of the survey asked the participants to list their respective facilities' objectives for the rehabilitation of patients who had undergone a total hip replacement surgery by using a Likert scale with 1 being high priority and 5 being low priority. The

objective that was given the highest priority by the participants was found to be improving core stability with a mean of 2.96 and the one with the lowest priority was found to be a tie between improving mobility and restoring functional gait patterns. This information can be seen in Table 3.

#	STATSTABLEWIDGET.FIELD_NAME	Minimum	Maximum	Mean	Std Deviation
1	Improving balance control	1.00	5.00	3.32	1.43
2	Reducing muscular imbalances	1.00	5.00	3.13	1.48
3	Improving mobility	1.00	5.00	4.05	1.53
4	Restoring functional gait patterns	1.00	5.00	4.05	1.62
5	Recovery of activities of daily living	1.00	5.00	3.81	1.65
6	Improving core stability	1.00	5.00	2.96	1.40
7	Pain reduction / freedom of pain	1.00	5.00	3.62	1.29
8	Strengthening of hip muscles	1.00	5.00	3.78	1.69

Table 3. Likert Scale of which objectives are given higher priority for rehabilitation in patients (1 high priority-5 low priority)

Strength Training Intensity-15 days

The participants of this study were asked in question 12 to rank what they thought was the optimal strength training intensity 15 days after the surgery by using Borg Scale (6-20). The majority of the participants felt that the optimal intensity fell in the fairly light category and whereas the two options that were chosen the least were very light and

very, very hard with only one participant choosing each. This data can be seen in Figure 6.

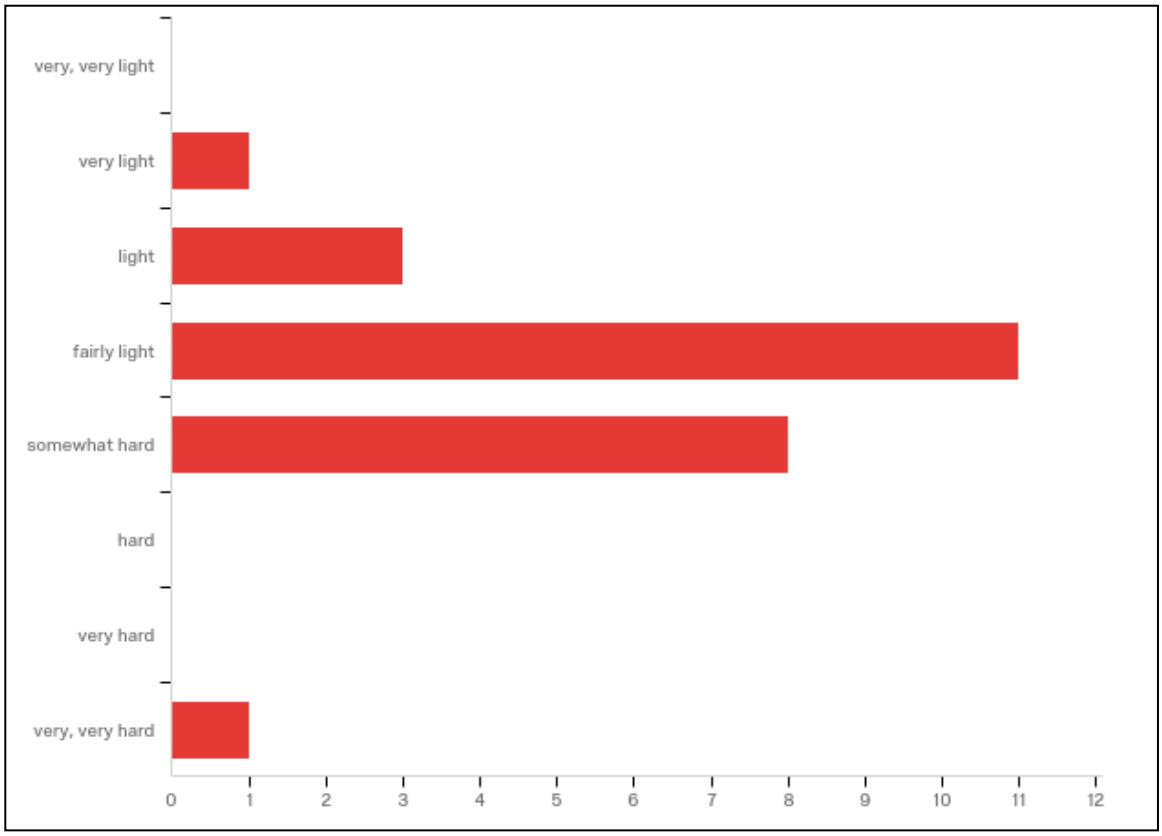

Figure 6. Data demonstrating the strength training intensity for 15 days after surgery using a Borg scale.

Strength Training Intensity- 3 months

In question 13 the participants were asked the same question that they were asked in 12 however this time instead of asking for the strength training intensity for 15 days after surgery, this time it was for 3 months after surgery. The majority of the participants felt that at 3 months after surgery the intensity of the strength training could be considered hard and there not be any complications to the patient. The intensity that was chosen the least was a tie between very, very light and very, very hard with only one

participant choosing either one. The information found from this question can be seen in Figure 7.

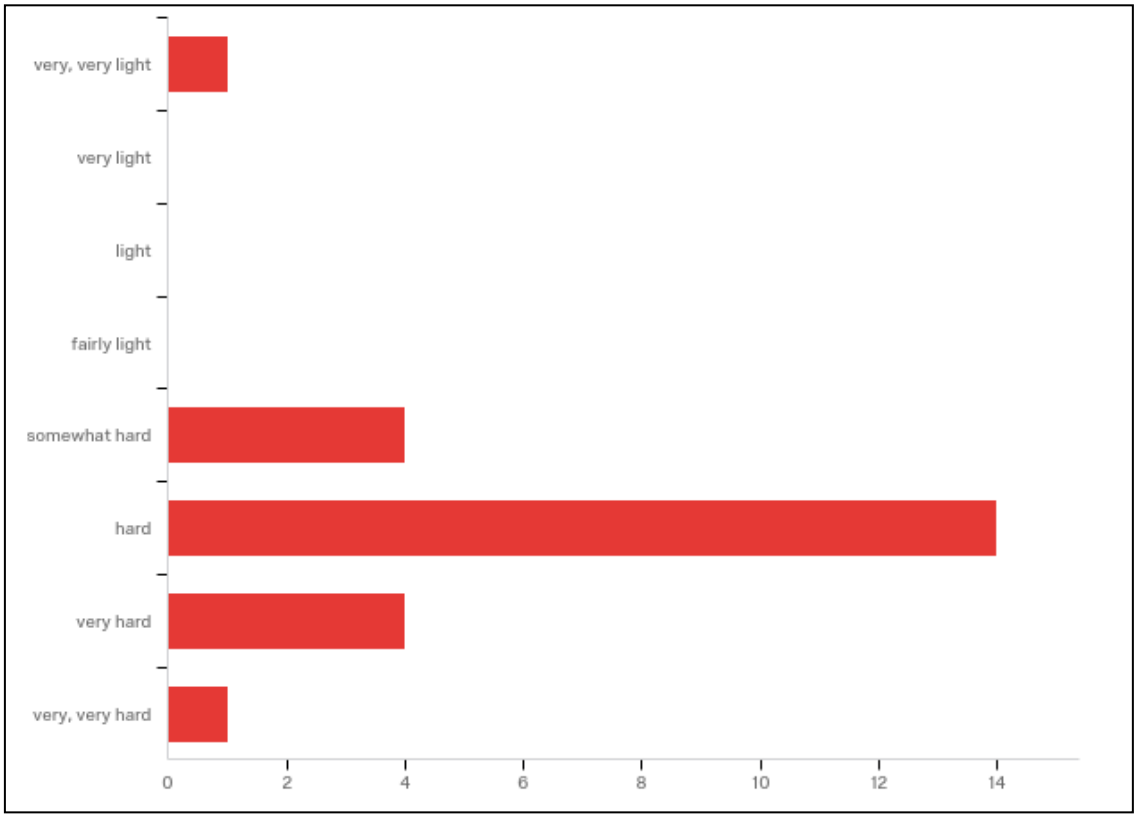

Figure7. Data demonstrating the strength training intensity for 3 months after surgery using a Borg scale.

Joint Load

For the last question the participants of the survey were asked to rate the joint load of the hip during a number of listed exercises by using a Likert scale with 1 being a very low load and 10 being maximum load. The exercise that was shown to have the highest load according to the mean was one-leg standing with the mean being at 7.91 and the lowest joint load being low resistance ergometer cycling with a mean of 3.00. This information that was gathered can be seen displayed in Table 4.

#	STATSTABLEWIDGET.FIELD_NAME	Minimum	Maximum	Mean	Std Deviation
1	Ergometer cycling, low resistance	1.00	8.00	3.00	1.60
2	Ergometer cycling, high resistance	1.00	10.00	5.22	1.74
3	Walking 4km/h (.62 mph)	1.00	8.00	5.70	2.03
4	One-leg standing	3.00	10.00	7.91	1.91
5	Sitting	1.00	8.00	3.59	2.12
6	Chair rise	4.00	9.00	6.48	1.28
7	Bridging	3.00	10.00	5.65	1.86
8	Abduction in lateral position	2.00	9.00	5.96	2.33

Table 4. Ranking of joint load for different exercises using a Likert scale with 1 being a very low load and 10 being maximum load

Outside Research

After utilizing the online library through Georgia Southern, a few different studies were found that dealt with the timing of implementation of full body weight bearing exercises after a total hip replacement. One of these studies was a meta-analysis were they agreed that the "postoperative weight-bearing timing remains controversial" (Peng, et al., 2017). Peng found that some scholars recommended that the partial weight bearing time frame in patients who had uncemented total hip replacements should last from 6-12 weeks. However the meta-analysis that was conducted provided evidence to support

immediate full weight bearing exercise after a patient undergoes an uncemented total hip replacement (Peng, et al., 2017).

In a second study, Hol found "strong evidence for immediate unrestricted weight bearing after primary total hip arthroplasty." The study also stated that "patients should start their rehabilitation as soon as possible after surgery with immediate weight bearing as tolerated" (Hol et al. 2010).

A study done by Wolf, et al., results were found explaining that "full weight bearing immediately after operation did not show any negative effects on the primary outcomes, implant stability, and bone mineral density, around an uncemented femoral stem" (Wolf et al., 2010). They stated that "there is not consensus on the best rehabilitation regime after uncemented total hip arthroplasty" (Wolf et al., 2010).

DISCUSSION

As the previously mentioned studies have pointed out, there are some heavily disputed ideas about when to implement full weight bearing in patients who have undergone a total hip replacement. This study sought to get an idea from practicing physical therapists in order to see when they thought the ideal time was to proceed with this specific form of rehabilitation and compare them to current research findings. The results illustrated in Figure 2 from question 6 of the survey found that a majority of 18 participants felt that the optimal time to introduce full weight bearing in patients with a cemented prosthesis was within 0-5 days after the surgery. Whereas 3 participants felt that this should be introduced 11-20 days after the surgery, 2 felt that 6-10 days was best, 1 held that 21-30 days was optimal, and finally one participant felt that the patient should not be introduced to full weight bearing until after 8 weeks. The variation between

participants could be due to factors such as years of experience, number of patients they see with total hip replacements in a month, and even where they work. The facility in which the participant works could be a major factor on their opinion because if all they work with are the elderly they may feel more inclined to reduce the intensity of rehabilitation techniques.

A slightly different situation was found when asking the same question but this time pertaining to an uncemented prosthesis. The results from question 7, illustrated in the Figure 3 graph, showed that there was a much larger split of opinions than there was when discussing a cemented prosthesis. A total of 7 participants felt that the optimal time to introduce full weight bearing was 0-5 days after surgery with a close second being 6-10 days after surgery with 6 participants supporting this option. The results in this question are not as unevenly distributed as the results are in question 6; however the questions are almost identical. Between the two questions, the only difference is the type of prosthesis and this could explain why a majority of participants felt that a later time frame after surgery was more appropriate but it does not explain the reason why the answer choices in question 7 were so similar in ranking. Possibly this could be due to the fact that there really is not much of a "consensus", as Wolf puts it, on when to start this type of rehabilitation treatment in uncemented prosthesis (Wolf et al., 2010).

When asking the participants about when to begin resistance training there was a similar distribution of answers. For the cemented prosthesis, a majority of the participants felt that it would be beneficial to begin around 1-7 days postop which is shown in Figure 4. Whereas when the same question was asked about an uncemented prosthesis, the answers from the participants were much more even across the graph in Figure 5.

Reasons for this could be due to certain physical therapists not being as familiar with an uncemented prosthesis as they are with a cemented one. Or it could even be attributed to a therapist's anxiety of altering the prosthesis since it is not cemented into the bone and therefore would rather keep the rehabilitation techniques light as the patient is still healing from surgery.

The data that was collected from this survey has shown that many therapists agree that full weight bearing should be implemented in patients with a cemented prosthesis as soon as possible which also agrees with the research done by Peng et al., Hol et al., and Wolf et al.. In each of the outside studies there was support for as much weight bearing as possible immediately after surgery. The study performed by Wolf also showed that there were no negative effects to full weight bearing immediately after surgery in patients with uncemented prosthesis. Generally the consensus in the gathered data was that immediate full weight bearing after surgery is recommended for patients with either a cemented or uncemented prosthesis and yet in the data from this survey, Figure 3 and Figure 5 both showed that the participants of this study felt that it was better to wait for a few weeks before beginning full weight bearing or resistance training. Because of this, it is important that steps are taken in order to create a proper rehabilitation protocol that ensures a balance of patient safety along with optimal recovery of mobility and strength.

As with all research, this study is not without its limitations. One such limitation is the small number of participants in the survey. A larger number of participants would have given greater reliability to the data that was found as it would have represented a greater portion of the population that was being studied. Another limitation could be found in participant error when answering questions. This could be seen in question 10

and 11. When ranking the choices in both questions, the scale is reverse from previous questions because in these two questions, 1 was given a higher priority than 5. Logically it would make sense in question 10 that utilizing gait training would be given a higher priority over continuous passive motion. Likewise in question 11 it makes more sense to improve mobility and restore gait patterns than to focus on core stability. While all of the options are important and should be focused on it is possible that the data is skewed do to a user error.

Further research is required to get a more complete understanding of the negative effects on both a cemented and uncemented prosthesis if full weight bearing is started immediately after surgery. As this study looked at many different factors that could influence a physical therapists decision, such as quality of surgery and constitution of the patient, it is important to create a very specific rehabilitation regime for an individual that also follows an overarching set of protocols when dealing with a specific type of recovery. More research should be done to discover better and more efficient methods of rehabilitation for patients with total hip replacements so that their quality of life can be better improved after this process.

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KEY WORDS

Total Hip Replacement, Recovery Protocols, Timing of Implementation, Full Body, Weight Bearing, Exercises, Physical Therapists, Cemented Prosthesis, Uncemented Prosthesis

Institutional Review Board (IRB) Approval

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